REMARKS

This amendment corrects typographic errors in a few paragraphs of the specification. To simplify matters in prosecution of the present application, claims 28-49, 52-69 are also canceled; they do not call for a set of observed samples to be compared to a second set of samples that are "modeled as a function of parameters," as discussed below. Assignee views claims 28-49, 52-69 as being drawn to inventions that are separate and distinct from those of the remaining claims and believes that they are allowable over the references of record for their own separate reasons. Accordingly, assignee cancels them without prejudice, reserving the right to file them in a continuation application.

Assignee would like to thank the Examiner for re-issuing the Office Action mailed May 20, 2005 in non-final form after two brief telephonic interviews with the undersigned during August 2005. In those interviews, assignee pointed out that the Office Action should not have been made final because it introduced a new ground of rejection. For example, independent claim 50 was allowed in the Office Action dated June 7, 2004 but now stands rejected.

Assignee also notes with appreciation that claims 25-26 are allowed and claim 19 is indicated as being drawn to allowable subject matter. However, the re-issued non-final Office Action rejects all of the other pending claims as obvious over U.S. Patent 6,134,261 to Ryan in view of various other secondary references.

Ryan, however, has significant shortcomings when compared against the rejected pending claims. Assignee respectfully urges the Examiner to give the detailed remarks below careful consideration and believes that doing so will make it clear that the rejections cannot be sustained in view of the clear distinctions between the rejected claims and the Ryan reference, embodied in various claim elements.

COMPARISON BETWEEN OBSERVED AND MODELED SAMPLES

Independent claims 1, 27, 50, 71-73 call for a set of observed samples to be compared "to a second set of samples ***modeled as a function of parameters***." Claim 1, part (c); *see also* claim 27, part (c), claim 50, part (c)(1), claim 71, part (b)(1), claim 72, part (c)(1), and claim 73, part (b)(1). Significant are both the fact that sets of samples are being compared and that the modeled samples arise quite differently from the observed samples to which they are compared.

In understanding those "modeled sample" independent claims, consider first how the observed samples are obtained. The claimed methods and apparatus generate (or have structure that generates) a "periodic calibration signal," *i.e.*, an actual signal of a periodic nature having corresponding spectral content. Two of the claims of this group recite that the observed samples arise from a response to the calibration signal:

> a sample modeling and mismatch determination subsystem responsive to the calibration signal to provide a plurality of first sets of observed samples [cl. 71]
>
> a sample modeling and mismatch determination subsystem . . . wherein, during operation . . . the sample modeling and mismatch determination subsystem is responsive to the calibration signal to provide a plurality of first sets of observed samples [cl. 73].

The rest of the claims of this group recite that the observed samples result from frequency translating the calibration signal to provide one or several first sets of observed samples. In either case, the observed samples that are compared to the modeled samples arise from a response to, or a frequency translation of, the actual periodic calibration signal.

Now, in contrast with the observed samples, consider the ***modeled*** samples. They arise quite differently than the observed samples, namely from a function of parameters. Even if the modeled samples are generated as actual samples and not merely conceptually (see P10/L1-7), they arise from a function, not from a response to or frequency translation of the actual periodic calibration signal that produces the observed samples.

The claims of this "modeled sample" group stand rejected over Ryan. Ryan's calibration technique involves having a base station transmit "calibration bursts [that] are part of a transmission frame having a reference phase" (C2/L18-19) "in the form of a spread signal comprising the calibration signal spread over [a] plurality of calibration tone frequencies" (C2/L14-18) that are "arranged in a distinctive orthogonal frequency division multiplexed pattern unique to the base station" (C2/L3-5). A remote station "receives the calibration bursts and despreads the spread signal by using despreading weights. The unique pattern of the calibration burst enables the remote station to "distinguish the base station's bursts from other signals present in a crowded area" (C2/L5-7). The remote station measures values related to the relative phase difference between the calibration bursts and the reference phase" (C2/L19-23).

Ryan, however, does not teach or suggest any comparison between a set of observed samples and another set of samples ***that are modeled as a function of parameters***, as recited in the claims of this group.[1] Indeed, Ryan provides an example that appears to take a clearly different approach, computing relative phase by measuring phase of the calibration burst alone and then performing a conversion of that phase measurement based on the supplied reference phase.

Assignee believes that the distinction between assignee's observed-to-modeled comparison and Ryan's approach is apparent from a review of the aforementioned example, found at C6/L9-35 of Ryan. First, a remote station despreads the calibration burst "with the appropriate Hadamad [*sic*] matrix column" (C6/L9-11) and calculates phase from the arctangent of Q/I, where "Q and I are the axes of a two dimensional constellation diagram depicting a QPSK modulated signal," see C6/L18-24. Then the remote station "converts the phase measurement to be with respect to the SYNC header at the beginning of the calibration frame" (C6/L33-35).

[1] In conventional receivers, the process of receiving and despreading Ryan's calibration burst and distinguishing it from other signals would have typically involved "comparisons" between continuous or sampled signals, *e.g.*, in a spread-spectrum decorrelator. However, that is not a comparison between observed samples and modeled samples as claimed by assignee.

In the "response to arguments" section, the Office Action (p. 2) says: "Ryan, in fact, very clearly shows (abstract) comparing the current derived relative phase difference with a previous value of the relative phase difference that was derived from a prior measurement at the remote, or an earlier calibration burst . . ." With all due respect, that response does not explain how Ryan's "previous value . . . derived from a prior measurement" or "earlier calibration burst" could be considered "a set of samples *modeled as a function of parameters*" as required by the claims. To the contrary, a prior measurement or earlier calibration burst is derived from an actual signal, not a "modeled" one and is not a "function of parameters."

In view of the significant distinction over Ryan discussed above, the rejections of independent claims 1, 27, 50, 71-73 cannot stand. In addition, those claims further recite specific parameters for the modeling function, further distinguishing them from Ryan and the other references of record.

In the claims of this group, the modeling function's parameters include both "an estimated vector mismatch" and "a plurality of basis functions." By modeling samples based in part on an estimated vector mismatch and functions that form the basis of a modeled signal, systems and methods of the claimed inventions can advantageously perform iterative processes to determine the mismatch and, if desired, minimize it. See, *e.g.*, P10/L1-7 of assignee's specification:

> Sample modeling and mismatch determination subsystem 410 compares the observed samples from digitized calibration signals S3a and S3b to a set of modeled samples, which it generates either as actual samples or conceptually. Subsystem 410 models the modeled samples as a function of parameters including an estimated vector mismatch and a plurality of basis functions. Subsystem 410 determines a value of vector mismatch that minimizes the difference between the observed samples and the modeled samples.

The present specification, at P21/L13 through P29/L11, contains a detailed discussion of how estimated vector mismatch can be used in combination with basis functions to generate modeled samples and determine vector mismatch from that modeling.

As discussed above, Ryan does not teach or suggest any modeling of samples as a function of parameters. Clearly, Ryan also fails to suggest assignee's claim limitations that specifically recite as those parameters (1) an estimated vector mismatch and (2) functions forming the basis of the modeled signal.

Accordingly, claims 1, 27, 50, 71-73 are not obvious over Ryan, alone or in combination with any of the secondary references of record. The rejections of those claims thus cannot stand, and assignee respectfully requests that they be allowed.

SPECIFIC COMPONENTS OF THE DETERMINED VECTOR MISMATCH

Claims 2-26 are allowable in view of their dependence from claim 1. New dependent claims 74-75, 76-77, 78-79, 80 are likewise allowable in view of their dependence from independent claims 50, 71, 72, 73. In addition, those claims contain various additional limitations that provide independent reasons for allowance.

For example, dependent claims 7, 74, 76, 78 more specifically recite that the vector mismatch that is determined (at least to an estimate) includes a first value representative of phase mismatch and a second value representative of gain mismatch. The values are representative of mismatches between signal paths in the signal processing method or system recited by the parent claim. Assignee respectfully submits that Ryan does not teach or suggest determining a vector mismatch that includes both such values.

Claim 8 depends from claim 7 and even more specifically calls for the mismatch to include a plurality of phase and gain mismatch values, one such value for each of the plurality of tones in assignee's claimed calibration signal. With similar additional specificity, claim 75 depends from claim 74, claim 77 depends from claim 76, and claim 79 depends from claim 78. Ryan clearly does not teach or suggest determination of any multi-frequency vector mismatch as recited in those claims.

Thus, dependent claims 7-8 are allowable on their own merits even without regard to the allowability of claim 1 from which they depend. Indeed, the Examiner had earlier recognized that point in the Office Action dated June 7, 2004 by indicating

claims 7-8 (as well as dependent claims 3-6, 9-24) as being allowable if rewritten in independent form. The remarks of the latest Office Action do not explain any reason for withdrawing the indication of allowability. Claims 74-79 are allowable independently for similar reasons.

Dependent claim 80 calls for the determined vector mismatch to "include a plurality of deviations from a quadrature relationship between the in-phase and quadrature signal paths" where the vector mismatch includes one such deviation value for each one of the plurality of tones. That claim is allowable for reasons similar to those discussed above with regard to dependent claims 7-8 and 74-79.

CONCLUSION

Assignee hopes that the cancellation of unrelated claims and the discussion above will allow the Examiner to reconsider and better appreciate the clear distinctions between the claims now pending in the application and the references of record, including Ryan, whose pertinence to the claims (or the lack of same) assignee feels has been misunderstood. Assignee respectfully urges allowance of the pending claims.

Please feel free to telephone the undersigned if it would in any way advance prosecution of this application.

Respectfully submitted,
NDSU RESEARCH FOUNDATION
by its representative

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